

Shallow Groundwater Fact Sheet

August 1999

A fact sheet providing information about the shallow groundwater aquifer

The purpose of this fact sheet is to define and describe the shallow groundwater aquifer and answer questions about environmental processes performed at Kelly Air Force Base (AFB) as part of the Installation Restoration Program.

HISTORY

In 1982, Kelly AFB began implementing an aggressive Department of Defense environmental cleanup program known as the Installation Restoration Program (IRP). The Kelly IRP is aimed at identifying, evaluating and cleaning up environmental contamination from past hazardous material use, storage, handling and disposal at the 82-year-old base.

Under the IRP, Kelly environmental engineers investigated past and present activities at the base to determine the types and sources of contaminants at Kelly AFB. Once the contaminants were identified, Kelly investigators began looking for those chemicals in the environment.

Contaminants often spread through the slow movement of shallow groundwater. Tracking the movement of contaminants involves continually testing the shallow groundwater on and around the base.

Although this shallow aquifer is not used as a drinking water supply, tracking contaminant movement and concentrations in it gives environmental engineers much information necessary to determine how best to clean up the contaminated sites.

Since the inception of the IRP, about 1,500 monitoring wells have been installed and countless soil samples have been gathered. The goal is to find the extent of contamination on and around Kelly AFB.

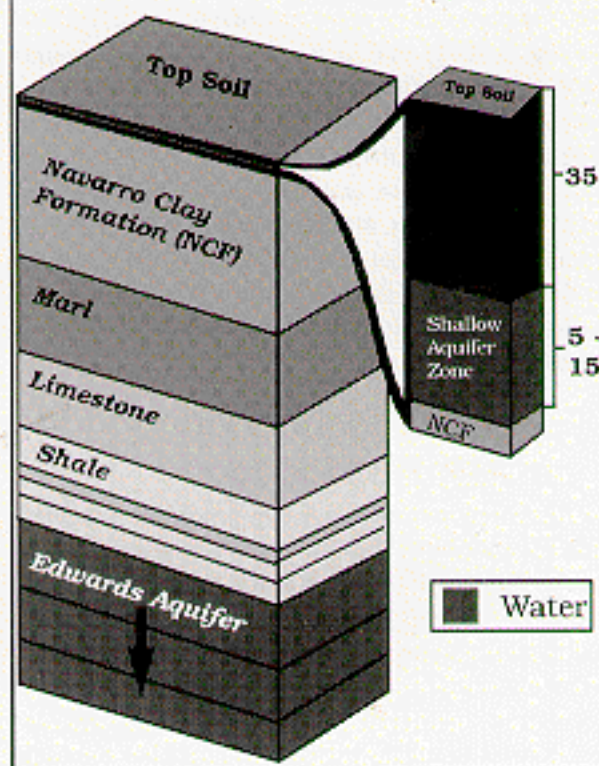
SHALLOW AQUIFER CHARACTERISTICS

The shallow aquifer under Kelly AFB and surrounding areas is a water-bearing zone found 15 to 25 feet below the surface. It is overlain by sedimentary layers of clay, sand, silt and gravel through which surface water, rainwater and contaminants pass with little difficulty.

The aquifer rests on the Navarro Clay Formation, composed of a very coarse clay material that water cannot penetrate. The Navarro Formation is only the top layer of an 800 to 1,000 foot series of deposits ranging from clay to limestone.

This series of layers effectively separates the shallow aquifer from the Edwards Aquifer, which is the source of San Antonio's drinking water. Since the shallow aquifer is fed directly from rain and runoff, it has no protection from pollutants.

Shallow Groundwater Relative to Edwards Aquifer



WHAT CHEMICALS WERE FOUND?

The extensive groundwater monitoring performed part of the cleanup program at Kelly was important in determining what chemicals have entered the shallow groundwater and the location and concentrations of those chemicals. In general, chlorinated solvents such as Perchloroethylene (PCE) and Trichloroethylene (TCE) are widespread throughout the shallow groundwater aquifer at Kelly both on the base and in some off-base areas.

Kelly has also found breakdown or daughter products from these solvents in the shallow groundwater. Breakdown products result when chemicals naturally degrade in the soil or groundwater. Chemical, physical and biological processes affect the primary contaminant, causing it to decompose into other chemical compounds.

Fuel is present in groundwater under parts of the base where leaking underground storage tanks were present or fuel spills have occurred. Metals from various disposal operations have also entered the shallow aquifer, however, these heavy contaminants tend not to migrate far.

Contaminant concentrations are monitored according to the provisions of state and federal regulations. The Maximum Contaminant Level (MCL) is the regulatory limit of a chemical in the drinking water. According to federal and state law, public drinking water may not contain more than the specified MCL of a particular contaminant. Although the shallow groundwater aquifer is not the source of San Antonio's drinking water, Kelly will review and implement its cleanup alternatives if it is determined that contaminant concentration levels in any area are above regulatory MCLs.

WHAT DOES THIS MEAN?

Most chlorinated solvents are inherently hazardous. However, the presence of these chemicals in the shallow groundwater at Kelly and in the neighborhoods around the base does not pose a health threat due to the low concentration levels and lack of an exposure pathway to people.

Because the contaminated water is 15 to 25 feet underground, there is no easy way for a person to be exposed to the chemicals. Most homeowners in southwest San Antonio currently get their water from the Edwards Aquifer through the Bexar Metropolitan Water District or the San Antonio Water System, so they are not exposed to the shallow groundwater.

WHAT WILL THE AIR FORCE DO?

The Air Force will clean up any problems it created according to procedures laid out by both state and federal law. The Air Force will continue to investigate and develop appropriate cleanup alternatives in compliance with state and federal regulations and in coordination with the responsible agencies.

Information gathered during long-term investigations is used to create a final cleanup plan for each

major source of contamination and its affected area. This plan must be approved by both the Texas Natural Resource Conservation Commission (TNRCC) and the Environmental Protection Agency (EPA) and must be presented to the community before it is implemented.

Investigations may also help locate other sources of contamination not associated with the base that might otherwise go unnoticed.

GLOSSARY

Aquifer: An underground geological formation that contains water. The shallow aquifer is the aquifer closest to the surface and is, therefore, sometimes called the surficial aquifer. The Edwards Aquifer is a deep aquifer separated from the shallow aquifer under Kelly AFB by 800 to 1,000 feet of rock and clay. The Edwards Aquifer is the source of San Antonio's municipal drinking water.

Contaminants: Chemicals found in the environment resulting from human activity.

Concentration: The measure of the amount of a contaminant in soil or groundwater is called the concentration. Concentration is often measured in parts per billion or micrograms per liter (ug/L)

Groundwater: An underground accumulation of water, as in an aquifer.

Perchloroethylene (PCE): Also called tetrachloroethylene, this substance is a common industrial solvent used by the Air Force to remove grease from aircraft parts. PCE is also used in many other commercial activities.

Trichloroethylene (TCE): A common industrial solvent used by the Air Force to remove grease from aircraft parts. TCE is also used in many other commercial activities.

Sampling: Collection of a small amount of groundwater from a monitoring well. Samples are then laboratory analyzed for presence or absence of a contaminant, or for the concentration levels of contaminants present.

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